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Properties of the short period CoRoT-planet population I: Theoretical planetary mass spectra for a population of stars of 0.8 to 2 solar masses and orbital periods of less then 20 days

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We study the planet populations in the discovery window of the CoRoT-space- telescope scheduled for launch on December 27th. We base the prediction on "first principles" calculations of planet formation in the framework of the planetesimal hypothesis. Aims. To provide a-priori planetary initial mass functions for confrontation with the CoRoT-planet discoveries in the entire range of sensitivity of the CoRoT instrument, i.e. for all giant planets and down to terrestrial planet masses. Methods. We construct a comprehensive set of static complete-equilibrium core-envelope protoplanets with detailed equations of state and opacity and radiative transfer by convection and radiation. Protoplanets are calculated for host-star masses of 0.8 to 2 solar masses and orbital periods of 1 to 16 days. We subsequently check the stability of the planetary population by a series of methods. Results. We find the static planetary populations to be stable and thus a plausible ensemble to predict the planetary IMF for orbital periods in the specified range. Conclusions. We predict bimodal planetary initial mass functions with shapes depending on orbital period. The two main maxima are around a Jupiter mass and about 50 earth masses. We predict an abundant population of Hot Neptunes and a large population of planets that fill the solar-system gap of planetary masses between Neptune and Saturn.